

The large cartilaginous three-way piece, in which the trachea terminates inferiorly, is compound, being formed of several fixed rings. It is complete in front, being represented behind by a hooked process on either side, extending inwards towards the middle line, where the two nearly meet. The lateral muscles of the trachea extend down to the upper margin of this peculiar syrinx; and a few of their anterior fibres continue onwards to the surface of the cartilaginous box, where they terminate, sometimes higher and sometimes lower, but always before reaching its inferior margin.

8. Note on the Gizzard and other Organs of *Carpophaga latrans*. By A. H. GARROD, M.A., F.R.S., Prosector to the Society.

[Received December 3, 1877.]

In the collection of birds preserved in spirit by H.M.S. 'Challenger' is the body, after the skin had been removed, of a single specimen of *Carpophaga latrans*, together with the gizzard of a second individual of the same species, obtained at Kandavu, Fiji. These form the material for the present communication.

In his note-book Mr. John Murray makes the following remarks on the species¹:—"Stomach contained the fruit of some tree unknown to me. The coat of the stomach had hard papilla-like ossifications of a circular form, two or three rows. . . . These indurations are composed of a horny substance"—from which it is seen that Mr. Murray was the first to recognize the existence of the strange arrangement to be here described.

The thin-walled and capacious crop contained only one thing in its interior—a complete fruit, which has been identified for me by Mr. W. T. Thiselton Dyer, as that of *Oncocarpus vitiensis*. In the gizzard was also found a portion of a second example of the same fruit.

Oncocarpus vitiensis is a tree belonging to the natural order Anacardiaceæ, which, according to Dr. Seemann², is "about sixty feet high, bearing large oblong leaves and a very curious corky fruit, somewhat resembling the seed of a walnut." The tree is included among those which are poisonous by the Fijians; and its sap produces an intense itching of the skin, when brought into contact with it, whence the native name Kau Karo or itch-wood.

For the crushing of this very hard fruit a special anatomical modification of the gizzard-walls of this Fruit-pigeon is developed, which is peculiarly interesting and tends to prove the plasticity of organs when aberrant forces come into play.

The gizzard is not developed to any thing like the extent that it is

¹ Vide P. Z. S. 1877, p. 737.

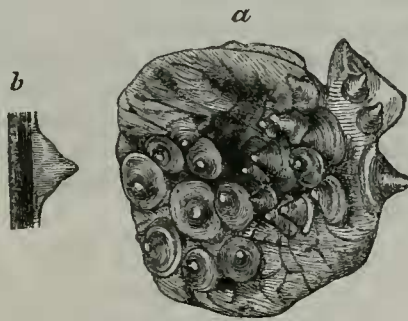
² Seeman's Mission to Viti, p. 334.

in the Gallinæ or Anseres, but, as in most *Carpophagine* birds, is small, and has its muscular-walls comparatively ill-developed. No stones of any kind were found in it.

It is the epithelial lining which is so peculiar in *Carpophaga latrans*. Instead of being smooth, or folded into plications, as is usually the case, its surface is raised into horny cones which closely resemble in appearance the tubercles for the attachment of the spines of the Echinoderm genus *Cidaris*. In fig. 1, *a*, the interior of the gizzard is represented; fig. 1, *b*, is a section of one of the cones resting upon the muscular gizzard-wall.

These conical processes are corneous throughout, are erect, and are quite transparent when cut into sections. There are twenty-

Fig. 1.



Interior of the gizzard of *Carpophaga latrans*.

three of them, large and small, in each of my specimens. The larger cones, which are the more numerous, average seven millimetres in diameter at their bases, their axial length being about four millimetres; the smallest cone is four millimetres across and of nearly the same height.

The cones are arranged, close to one another, in a fairly regular manner upon the two muscle-masses, being distributed in rows of three, counting either transversely or longitudinally. This disposes of eighteen of the twenty-three cones. The remaining five are found on the tendinous intermuscular walls of the organ, in longitudinal rows, two in one row, three in the other.

A section of any one of the cones demonstrates that it is not in the least ossified, but corneous throughout, and of about the density of ox-horn. It is also seen that the attached surface of the epithelium does not participate in the undulations of the free surface, being quite smooth. Neither does it send any processes into the cones. Between the cones the epithelium is yielding, and only semicorneous.

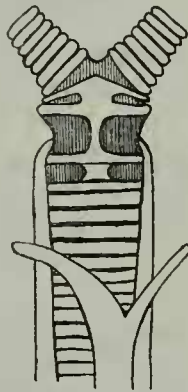
A still further exaggeration of this abnormal condition of the epithelium of the gizzard of *Carpophaga latrans* has been described

by MM. Jules Verreaux and O. Des Murs in *Phœnorhina goliath*¹ of New Caledonia, which "se nourrit de graines de *semicarpum*." In this bird "le gésier, déjà on ne peut plus musculeux par lui-même, a sa surface intérieure régulièrement recouverte . . . de pointes véritablement osseuses, rappelant la forme de celles qui se voient à la surface du corps de la *Raia* bouclée, ou *Clavel*, ou *Clavelade*. Ces pointes, en cône aplati, ont leur base plane de 5 millim. de diamètre, d'une hauteur de 5 à 6 mill., sont légèrement inclinées sur elles-mêmes, et quelquefois recourbées par la dessiccation, l'extrémité eu étant mousse." A central fibrous peduncle is also said to run through each osseous element.

Phœnorhina goliath, from what has been said above, therefore differs from *Carpophaga latrans* in having the cones of the gizzard proportionally longer, at the same time that they are ossified (which necessitates the presence of vessels in the ossification, which appear after death as the fibrous cord) and oblique. There is, however, a great similarity between the two organs.

I am informed by the Rev. S. J. Whitmee that *Carpophaga pacifica* in the Samoan Islands feeds on nutmegs, from which it is highly probable that in that species the gizzard-epithelium is modified in a manner similar to that of the Fiji or New Caledonian species. Specimens of *C. pacifica* preserved would therefore be of special interest for the determination of this point.

Fig. 2.



Syrinx of *Carpophaga latrans*.

With reference to the other parts of *Carpophaga latrans*, the intestine is very capacious, only nine inches long, and transversely sacculated from the contraction of its outer longitudinal muscular coat, this producing the appearance of thirty bold transverse folds on the mucous surface. There are no colic cæca; and, as in the genus *Carpophaga* generally², the gall-bladder is well developed. The liver-lobes are equal in size.

¹ Revue et Magasin de Zoologie, 1862. p. 168. ² Vide P. Z. S. 1874, p. 258.

The syrinx (fig. 2, p. 104) is Columbine, with its lateral muscles attached inferiorly to the membrane between the penultimate and antepenultimate tracheal rings. The trachea is composed of rings which are very yielding in the middle line posteriorly. As can be seen in the figure, the muscoli sterno-tracheales, which are independent of the intrinsic muscles, are not quite symmetrically attached.

The furcula, as is the rule in the subfamily, is very slender, but complete, wherein this species differs from *Phænorhina goliath*, in which it is cartilaginous at its symphysial end, according to MM. Verreaux and Des Murs¹.

Myologically, the ambiens is to be found, not large; the femoro-caudal with its accessory head are well developed; the semitendinosus and its accessorius are the same.

There are two carotids; so that in this as well as all the other features above mentioned *Carpophaga latrans* agrees with my definition of the division of the Columbidae into which it naturally falls, its gizzard differing, however, from that of all but one of the species which have been examined.

9. Description of a new Species of *Helix* from Japan.

By EDGAR A. SMITH, F.Z.S.

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HELIX (CAMENA) CONGENER, n. sp.

Testa convexiusculo-orbiculata, spira breviter conica, subaperte umbilicata, tenuis, sordide pallido-virescenti-albida, fasciis tribus nigrofuscis, media latissima, infima umbilicum pingente; anfractus 5½, convexiusculi, lineis incrementi obliquis flexuosis, striisque spiralibus confertis insculpti, ultimus subtus satis convexus, prope aperturam leviter breviterque descendens; apertura perobliqua, semilunaris, intus fasciata; peristoma tenue, roseum vel lilaceum, marginibus conniventibus, supero breviter expanso, basali et columellari latius reflexis.

Diam. max. 30 mill., min. 25, alt. 18; aperturæ long. 15, lat. 14.

As this form approaches very closely to *H. peliomphala* of Pfeiffer, I will give a comparative description as the best means of showing its distinctness.

It is uniformly smaller, more narrowly umbilicated and of a paler ground-colour; its spire is constantly more elevated, aperture smaller; the banding in the fourteen specimens examined invariably follows the same arrangement, and not one of them exhibits any trace of the opaque yellow stripes or blotches which are almost invariably observable in a greater or less degree (on the bands most conspicuously) in *H. peliomphala*.

This is a very pretty, delicate species, and of a thin semitransparent texture. On the front of body-whorl, about two thirds of its whole extent from the lip, there is an oblique strongly marked line which is

¹ *Loc. cit.* p. 140.